Progress Toward Standards

Grade 6

Mathematics

Framework

1/13/03

Strand 1: Numbers and Operations

Standard 1.1: Students demonstrate understanding of number concepts.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- translating among forms for expressing large numbers, e.g., standard notation, expanded form, words
- recognizing and generating equivalent fractions and equivalent ratios
- recognizing and generating equivalences between fractions and decimals
- relating percents between 1% and 100% to their fraction and decimal equivalents
- ordering and comparing whole numbers, mixed numbers, fractions, and decimals
- recognizing the meaning of exponents, perfect squares, and square roots of perfect squares less than 150
- finding prime factorizations, least common multiples, and least common divisors

Standard 1.2: Students demonstrate an understanding of the concepts of operations.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- judging the effects of addition, subtraction, multiplication, and division with fractions and decimals
- applying the commutative, associative, identity, and distributive properties and the multiplicative inverse property

Standard 1.3: Students demonstrate fluency in computing and estimating.

In the grade 6 test, fluency is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- adding, subtracting, multiplying, and dividing with whole numbers, fractions, and decimals
- applying correct order of operations
- finding percents of numbers
- estimating based on operations described above

Strand 2: Algebra

Standard 2.1: Students demonstrate understanding of patterns, relations, and functions.

In the grade 6 test, facility is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- finding any designated term in a numeric or geometric pattern
- representing rules for real life and mathematical linear patterns using words, algebraic expressions, or equations
- drawing conclusions and making predictions based on linear patterns, both mathematical and real life

Standard 2.2: Students demonstrate the ability to use algebraic symbols to represent and analyze situations.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- representing linear real life situations with simple algebraic expressions or equations
- solving problems such as balance scale problems that serve as readiness activities for equation solution using algebraic methods
- solving linear equations using inspection or an algebraic method involving a single step
- evaluating expressions for given values, e.g., in formulas such as the formula for the area of a rectangle
- recognizing the relationship between linear equations and their graphs, given real life situations that are linear

Standard 2.3: Students demonstrate the ability to create models to represent mathematical relationships.

In the grade 6 test, ability is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- recognizing and creating multiple representations (e.g., words, charts, algebraic expressions or equations, and graphs) of the same simple linear real life situation

Standard 2.4: Students demonstrate an understanding of change in a variety of situations.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- matching a situation involving a constant or variable rate of change, described without the use of exact data, to a table or graph that best represents that situation
- determining in a simple real-life situation involving a constant rate of change how a change in one variable affects the other variable

Strand 3: Geometry

Standard 3.1: Students demonstrate understanding of two- and three-dimensional geometric shapes and the relationships among them.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- reasoning about geometric figures and the relationships among them based on their definitions and properties
- representing points, lines, line segments, rays, and angles with models and symbols
- determining characteristics of various polygons including isosceles, scalene, and equilateral triangles
- identifying congruent shapes, including those shown on dot or grid paper
- recognizing similar figures in real-life situations

Standard 3.2: Students demonstrate understanding of coordinate systems.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- using ordered pairs as coordinates of points in a four-quadrant coordinate plane

Standard 3.3: Students demonstrate understanding of symmetry and transformations.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- identifying figures with rotational symmetry and determining the number of different turns that result in matches to original figure
- identifying the result of translating, reflecting, or rotating a geometric figure
- describing the transformation (translation, reflection, or rotation) that moves a figure from one position to another
- determining the coordinates of points of an image of a figure on the coordinate plane after a translation or reflection

Standard 3.4: Students demonstrate an ability to perform visual and spatial reasoning.

In the grade 6 test, ability is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- constructing a net (pattern) for a common 3-dimensional figure such as a prism or pyramid
- identifying views (e.g., front, top, right side) of a structure built from cubes

Strand 4: Measurement

Standard 4.1: Students demonstrate understanding of concepts and processes of measurement.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- selecting the best unit to use relative to the purpose of the measurement as well as the type of measurement
- selecting the correct unit (linear, square, or cubic) to use for linear, area, or volume measurement
- determining how a change in side length affects the perimeter or area in rectangles
- performing conversions among measurements of area and volume, e.g., 1 square centimeter is equal to 100 square millimeters
- performing conversions among customary units and among metric units for linear measurements and measurements of capacity and weight
- estimating equivalent measures between the customary and the metric systems based on benchmark equivalents
- making reasonable estimates of distance or height based on common benchmarks or given information, e.g., an estimate of the height of tree given a picture of a man standing next to the tree

Standard 4.2: Students demonstrate facility with the tools, procedures, and formulas of measurement.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- using protractors to measure angles to the nearest degree
- solving problems involving rates and common derived measurements, e.g., miles per gallon and cost per unit
- estimating perimeters and areas of irregular regions shown on a grid
- finding perimeters of polygons and, given the formula, circumferences of circles
- using given formulas to find the areas of triangles, parallelograms, trapezoids, and circles as well as figures that can be subdivided into rectangles
- using given formulas to find the volumes of prisms and cylinders
- solving problems involving scale factors in maps and scale models

Strand 5: Data Analysis and Probability

Standard 5.1: Students demonstrate facility in collecting, organizing, and displaying data.

In the grade 6 test, facility is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- determining appropriate data to collect for a given purpose and how to go about collecting and analyzing that data
- selecting appropriate graphic representations for data sets
- reading and constructing bar graphs, pictographs, line graphs, line plots, stem-and-leaf graphs, circle graphs, frequency charts, and histograms

Standard 5.2: Students demonstrate an understanding of statistical methods.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- calculating the mean, median, mean, and range of a data set and interpreting their meanings relative to the data set
- making judgments regarding the shape and spread of data sets

Standard 5.3: Students demonstrate the ability to draw conclusions and make inferences based on data.

In the grade 6 test, ability is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- drawing conclusions and making inferences and predictions based on data given in charts and graphs

Standard 5.4: Students demonstrate an understanding of probability.

In the grade 6 test, understanding is demonstrated with the following indicators as well as by solving problems, reasoning, communicating, representing, and making connections based on the indicators—

- determining all possible outcomes for an experiment, using a tree diagram, an organized list, or, when appropriate, the fundamental counting principle
- finding the theoretical probability of an event in an experiment with equally likely outcomes
- finding the empirical probability of an event, given a set of data
- making predictions based on given probabilities